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COMMITTEE ON AVIATION ENVIRONMENTAL PROTECTION (CAEP)

STEERING GROUP MEETING

Paris, 10 to 13 September 2002

SUMMARY OF DISCUSSIONS AND DECISIONS OF THE FIRST MEETING OF THE STEERING GROUP

Tuesday, 10 September 2002

1. GENERAL

1.1 The meeting was attended by 17 CAEP Members, and 8 Observers as well as the Rapporteurs and Vice-Rapporteurs of the CAEP working groups. Members from Tunisia and South Africa were unable to attend the meeting.

1.2 Mr. Carl Burleson, CAEP Member from the United States, was appointed Chairperson of the meeting.

2. AGENDA ITEM 1: ADMINISTRATIVE ARRANGEMENTS WP/1

2.1. The meeting approved the agenda and working hours as proposed in WP/1.

3. AGENDA ITEM 2: DEVELOPMENTS SINCE THE LAST STEERING GROUP MEETING WP/2 AND 12 – IP/ 1, 2, 3, 4, 5 AND 7

3.1. The Secretary presented the main developments since the last Steering Group meeting (São Paulo, 04 to 07 December 2001) and following the Members Only meeting held in Madrid from 23 to 24 May 2002 (IP/1 contains the Summary of Discussions and Decisions of that meeting).

3.2 The meeting noted that Mr. Ron Walter had been replaced by Dr. Denis Savage as the new CAEP Member representing Australia and that since the members only meeting Mr. Bob Shuter (Canada) had been succeeded by Dr. David Lister (UK) as Rapporteur of WG3; Mr. Curtis Holsclaw (US) had been appointed to undertake Dr. Lister's function of Vice-Rapporteur of the group. The WG3 Secretary, Mr. Roger Gardner, had been succeeded by Mr. Chris Eyers.

3.3 The meeting was given an update on recent developments regarding liaison activities with other UN bodies since the CAEP Members Only meeting (reported in IP/2). It agreed to consider the UNFCCC Secretariat request to explore opportunities for examining and improving the quality of data after the discussions on Agenda item 3.

3.4 Regarding the new system recently implemented for the CAEP web site, the meeting took note of the password procedures (para.4.3 refers) and also that, with the new interactive system the rapporteurs were responsible for maintaining updated information on their own Working Group sites.

3.5 The issue of communicating with the public on the environmental initiatives was brought to the attention of the meeting. The members-only meeting recommended, based on the

conclusions of the workshop on operational opportunities to minimize fuel consumption and emissions from aviation (held in Madrid, Spain from 21 to 22 May 2002) that the Secretariat together with CAEP WG4 should further explore better means of providing information on aviation's environmental activities. The meeting supported the initiatives currently being explored by the Secretariat and WG4, which included the publishing of an ICAO Journal article on the event and the production of a CD on the work of CAEP, for general distribution as well as the organization of new workshops (the next one to be held in Ottawa/Canada from 4 to 5 November).

3.6 The meeting agreed to consider the request from the Council concerning possible means of streamlining the CAEP structure and the request from WG5 to ICAO regarding support for the work of WG5 (paras 6 and 7 respectively) later in the meeting.

4. AGENDA ITEM 8: FESG WPs 3 and 20;IPs 7 and 8

4.1 The Forecast and Economic Analysis Support Group (FESG) presented a report on its work (WP/3) complemented by two presentations by the rapporteur of the Traffic Forecast Sub-group.

4.2 The first presentation was a progress report on the forecast (included in IP/8).The forecast group is preparing a full update of the traffic and fleet mix forecasts used at CAEP/5. The forecast will be for a 20 year period with an intermediate year forecast and should be available by December 2002.

4.3 Some questions for clarification and some discussion followed the presentation. The member from Brazil informed the meeting that the traffic growth rates as reported for South America were below the level being considered currently by the Brazilian authorities and offered to interact with the forecast sub-group rapporteur to further verify these numbers.

4.4 The group endorsed the continuation of the forecast work and the main items of that discussion can be summarised as follows:

- The passenger route group forecasts are completed;
- The load factor analysis is being performed by ICAO;
- A new generic aircraft type category is to be included in the study (20 – 49 seats);
- The survivor curves were defined, and the group recommends the use of four survivor curves for new generation aircraft and three options for the others;
- The issue of stored aircraft has been addressed and will be reflected in the fleet forecast to be produced;
- Regarding the regional aircraft,: the group will review the available forecasts, and will generate new forecasts. It still needs to resolve the issue of the inclusion of the forecasts in the fleet;
- Regarding freight forecasts, the changes are expected to be minimal and the group intends to review the split between new /conversions in light of the current number of parked aircraft, and to revise the freight forecast as required; and
- A 2001 year-end, tail number specific, Aircraft Fleet Data Base will be made available.

The Steering group reviewed the progress being made by the FESG and endorsed the plan of action for completion of the forecast.

4.5 Considering that a complete forecast would be undertaken by FESG for emissions analysis purposes, the meeting agreed that an update of the noise information and possibly some runs using MAGENTA, could be undertaken after completion of the emissions work, and with a lower priority.

4.6 The second presentation concerned the analysis of the economic impact of the CAEP/4 emissions standard production cut-off and the conclusions were that:

- Two engine types would be affected: JT8D-200, and PW4090;
- The estimated cost would be $50 to $75 million U.S. Dollars:
  - Cost would be borne by one engine manufacturer;
  - Costs to operators were not included and are difficult to quantify; and
  - There were no quantified additional inventory costs available nor estimates of the impact on aircraft residual value.
- Benefits would be almost negligible
  - The proportion of annual global passenger departures with the affected aircraft /engine combinations would be equal to approximately 0.1%.

4.7 Some members were of the opinion that the benefits that could accrue to the engine manufacturer if he found that the means of complying with the standards should be quantified, but it was stated that it would be extremely difficult to undertake this analysis since it involved new technology development/availability, and other factors difficult to measure. Costs associated with the JT8D-200 were estimated to represent approximately 30% of the total.

4.8 Still regarding the analysis of expected benefits, the meeting requested that an assessment of the reduction in emissions associated with the production cut-off, expressed in terms of NOx savings per passenger carried, be provided to the next Steering group meeting.

4.9 Regarding tasks involving other CAEP groups, FESG is developing guidance material on the subject cost/benefit effectiveness for use in relation to the balanced approach to noise mitigation. The material is expected to be presented to WG2 early in 2003.

4.10 The group has initiated work on analytical tools to be used to evaluate the possible options that WG3 may put forward in relation to a future, more stringent, NOx standard.

4.11 A study is in progress on estimating the external costs of carbon dioxide emissions. The results are expected to be available for the next Steering Group meeting.

4.12 Work has continued on analysing the market-based options being considered. The question of whether to use the latest fleet and traffic forecast has arisen. The advice of the Steering Group is being sought on this issue and it will be discussed later on the meeting.

4.13 An examination of the differences between the AERO and STRATUS models is being undertaken and should be ready for presentation at the next Steering Group meeting.

4.14 FESG reported that it had also examined the data currently being reported to UNFCCC in comparison with that in CAEP's data bases. It was concluded that these bases were on different levels and that it would probably be a difficult task to establish a relationship between them. It was agreed to postpone discussion on this item to the next agenda item.

5 AGENDA ITEM 3: EMISSIONS TECHNICAL ISSUES WP/11, 18, 22 & 24 & IPs 5, 6, 9, 10 and 11

5.1 The Rapporteur of WG3 provided the meeting with a summary of the information and the discussions that took place at the Workshop on aircraft emissions reduction technology that was held on 9 September 2002 (IP/10 refers).

5.2 The key points emanating from workshop presentations and discussions :

a) The need for improved understanding of the trade-off and the setting of priorities;
b) The need for further research to understand the environmental consequences;
c) Definition of the drivers for industry to develop new technology;
d) The inability of technology development to compensate fully for the environmental consequences of traffic growth;
e) Potential for incorporation of emerging technologies into current products;
f) Availability of cost-benefit analysis already available in other sectors outside of aviation and the broader perspective on emissions;
g) Possibility of multi-level approach;
   - Standards for existing technology; and
   - Goals for emerging technology and future long-term research.

5.3 The information provided at the workshop was found to be extremely valuable and will be taken into account in the activities under development in WG3.

5.4 The meeting noted the report of WG3 contained in WP/18. The Alternative Emissions Methodology (AEM) Task Group (WP/18) had made good progress in the three key aspects of developing a cruise/climb certification methodology, as follows:

1) *Emissions prediction method:* all cruise emissions data would be based on LTO measurements and a prediction methodology using engine manufacturers P3-T3 method. Validation of the method and assessment of accuracy is sufficiently advanced that text could be drafted for incorporation into Annex 16 Volume II, if required.

2) *Cruise definition:* Definition of cruise is a complex issue. Single points on the edge of the flight cycle at the maximum capability of the aircraft, and mission-based certification are approaches which continue to be assessed.

3) *Reporting parameter:* Recent progress includes acceptance of MTOW as the best available correlating parameter for emissions productivity. However, it is unlikely that AEMTG will be able to propose a fully validated recommendation for CAEP/6. For CAEP/6, AEMTG intends to document the options which appear to be promising, with their pros and cons and the work that is still needed.

5.5 The Standards Task Group (STG) work had focussed on defining and collating technical information and data required in the analysis of LTO NOx emissions stringency options. It was expected that a proposal for a more stringent NOx Standard would be made to CAEP/6, subject to analysis by FESG, although a question of the definition of “technically feasible” was still being debated. No change to the CO and HC Standards was anticipated. IP/6 contained a description of the ongoing work on the definition of the NOx options.

5.6 The Long Term Technology Goals (LTTG) Task Group was studying the past relationship between research NOx emission targets and the corresponding emission performance actually achieved by production engines. It was hoped that this would provide a future indicator for relating research goals to production performance. It was proving difficult to define goals for the long term (+20 years) but goals for the medium term (+10 years) should be possible. The group continued to consider the appropriate certification parameter for the long term, but agreed that Dp/Foo should continue to be used for the medium term. The group agreed that emissions inventory models should

be used for assessing benefits for CAEP/6. Air quality models were not adequate at present. The group also reported on a number of secondary topics it had been progressing in addition to those listed. The meeting agreed on the deliverables proposed by the group (para 2.4).

5.7 Several members noted (WP/24) that WG3 was considering stringency increases for the NOx standard of between 5% and 20% at a pressure ratio of 30. They expressed the views that the lower options being considered (i.e 5% and 10% increases in stringency), while technically feasible, would have little environmental benefit. On the other hand, views were expressed that the technical feasibility of increases of 20% and above was in question. Nevertheless these members felt that stringency increases of 25% and 30% should be considered in the analysis, to determine their environmental benefits. It was also suggested that several implementation and production cut-off dates should be analysed.

5.8 The meeting undertook a substantial discussion on the NOx stringency analysis options. Views diverged on the definition of technical feasibility, on the range of options to be considered for analysis; and the need for the consideration of the production cut off dates. Historical information on the setting up of NOx Standards in CAEE and CAEP were also brought to the attention of the group.

5.9 While the meeting could not agree an technical feasibility definition it was decided it be addressed by a series of technical considerations (i.e number of in production engines affected; number of aircraft affected; availability of technology to achieve the standard; etc.) for each of the option analysed. WG3 and FESG were requested to prepare a Flimsy proposing to the group a matrix-based proposal to allow initial scoping of technical feasibility of a wide range of options, varying in stringency and applicability dates, and considering the implications of the production cut-off dates and initial economic and environmental impacts. The meeting agreed to return to the discussion after agenda item 5.

5.10 Regarding the draft text for Annex 16 in relation to exemptions permitting limited continued production of non-compliant engines (para. 2.5 b)), the meeting recommended that WG3 explore the historical background and the rational behind such provision and report back at the next Steering Group meeting.

5.11 Concerns were expressed with the progress on the definition of an emissions efficiency parameter for a revenue neutral charge and views were expressed that since WG5 work would be requesting this input to further progress the tasks, WG3 should address this issue with more vigour, aiming at responding to WG5 at the earliest opportunity. The rapporteurs of WG3 and 5 are expected to interact in that regard.

5.12 The meeting was informed that Sweden is contributing to the WG3 work in order to progress data for turboprops and non-certified engines.

5.13 A presentation from the UNFCCC Secretariat on recent developments related to the CAEP work followed (IP11 refers). The meeting noted the UNFCCC Secretariat's request to explore opportunities to examine and improve the quality of data reporting and comparability of aviation bunker fuel data, as well as and the considerations by WG3 and FESG regarding the evaluation of the data provided by the UNFCCC Secretariat. A major issue was the extent of the work involved, considering the workload already being faced by the groups. The meeting considered it important to cooperate with the UNFCCC Secretariat and agreed that the ICAO Secretariat should take the necessary steps to organize a "scoping meeting", involving UNFCCC Secretariat, the rapporteurs of WGs3 and.5, and FESG and experts on emissions inventory and data reporting, preferably at the margins of a CAEP WG meeting, and should report back to the next Steering group meeting.

6 AGENDA ITEM 4: EMISSIONS – OPERATIONAL ISSUE – WG4 WP/11 & WP/13

6.1 The meeting noted the report of WG4 as contained in WP/13. Concerning the assessment of the environmental benefits of introducing CNS/ATM technologies in the ICAO regions, the group reported that no funding had so far been forthcoming for a full parametric assessment (estimated to cost between US $200.000 and US $300.000). Development of modelling capabilities beyond the parametric model (e.g. SAGE) was continuing to be monitored. The group had therefore concentrated its efforts on data collection and was developing a questionnaire to be sent to the ICAO regions. Data so obtained would be required by any future model. There was a possibility that lack of progress on new models and lack of data might delay further work by the group in this general area.

6.2 The success of the first Operational Opportunities Workshop (held in Spain) was noted. A second workshop was to be held in Canada in November, 2002. It was planned to hold two further workshops before CAEP/6, but the venues had not yet been determined. It was noted that State and industry sponsorship of all workshops was necessary, since attendance was free.

6.3 The meeting reiterated the urge for publication of the ICAO circular, since it was the basic document for the workshop, and a primary means of providing information to the public.

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